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Remote Sensing and Field Reconnaissance for Rapid Damage Detection in Hurricane Katrina

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Hurricane Katrina (2005) brought unprecedented and multi-hazard infrastructure damage to the coastal areas of Mississippi and Louisiana, caused by wind, storm surge, low-velocity flooding, and levee breach. Hurricane Katrina marked the first opportunity to examine and preserve multi-hazard damage conditions via newly available remote-sensing technologies, which provide unparalleled views of the damage – at regional, neighborhood, and per-building levels. Available remote-sensing technologies include high-, medium-, and low-resolution optical satellite imaging, synthetic-aperture-radar imaging, and digital aerial imaging. As these data are available at a variety of spatial, spectral, and temporal resolutions, they are appropriate for different roles in preserving, analyzing, and understanding the overall effects of hurricanes on the built environment. These technologies are appropriate for preserving damage scenes, identifying hard-hit areas, guiding detailed ground-based surveys, generating initial loss estimates, assisting with insurance claims, and understanding damage patterns at multiple scales. In complement to the remote-sensing imagery, ground-based damage surveys provide a more-detailed perspective of damage, serve to verify remote-sensing damage signatures, and provide a basis for recommended roles of the various available remote-sensing technologies.

Immediately following Hurricane Katrina, field teams from MCEER deployed to the Mississippi Coast and to New Orleans to perform rapid and widespread assessments of damage at a per-building scale. A subsequent detailed study, integrating the numerous available remote-sensing data platforms with the ground-based survey data, was undertaken to identify the most appropriate roles for these multiple data platforms in rapid understanding of the damages resulting from a hurricane in a multi-tier framework, including Regional (Tier 1), Neighborhood (Tier 2), and Per-Building (Tier 3) damage assessments using appropriate damage scales for both wind and water damage. This paper presents our findings, our suggestions for the effective use of the various remote-sensing data platforms to provide pertinent loss data at multiple scales, and the dissemination of these data to the public.